

**REMARKS/ARGUMENTS**

Upon entry of this amendment, claims 6, 8, 16 and 23 will be canceled without prejudice or disclaimer of the subject matter recited therein, claims 1, 7, 12, 13 and 17, will be amended, and claims 24 and 25 will be added, whereby claims 1-3, 5, 7, 9-15, 17-22, 24 and 25 will be pending. Claims 1, 7, 12, 13, 14 and 17 are independent claims.

The amendments to the claims are supported by Applicants' originally filed disclosure, and therefore should not be considered to constitute new matter. For example, wherein said bioactive glass is substantially free from  $P_2O_5$  recited in claim 1 appears in original claim 8. The recitations of "0.1-1 mol % of  $CaF_2$ " as well as " $CaF_2$  being 0.1-1 mol %" find support in Applicants' originally filed specification at least at page 9, lines 4-5 and lines 17-18.

Further, the recitation of wherein said bioactive glass a sintering aid in a sintered calcium phosphate glass finds support at least at page 5, lines 16-17.

Still further, the recitation "wherein said bioactive glass generates a  $\beta$ -wollastonite crystal at a crystallization temperature" finds support in Applicants' originally filed specification at least at page 10, line 26 to page 11, line 1.

Reconsideration and allowance of the application are respectfully requested.

**Consideration Of Information Disclosure Statements**

Applicants express appreciation for the inclusion with the Office Action of an initialed copy of the Form PTO-1449, whereby the Examiner's consideration of the Information Disclosure Statement filed August 25, 2005 is of record.

Applicants further note that a Fourth Supplemental Information Disclosure Statement is being filed on even date herewith to make of record information cited in an Office Action mailed October 24, 2005 and information cited in an Information Disclosure Statement filed September 29, 2005 in Application No. 10/962,557 over which an obviousness-type double patenting has been maintained in the instant Office Action and which application was cited in the Third Supplemental Information Disclosure Statement filed August 26, 2005. The Examiner is respectfully requested to confirm consideration of this Fourth Supplemental Information Disclosure Statement by initialing the Form PTO-1449 submitted therewith, and forwarding the initialed form with the next communication from the Patent and Trademark Office.

**Response To 35 U.S.C. 112, Second Paragraph, Rejection**

In response to the rejection of claims 10, 11, 20 and 21 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, Applicants respectfully submit the following.

In this ground of rejection, it is asserted that claims 10, 11, 20 and 21 recite "sintered calcium phosphate glass". The rejection contends that a sintered glass is not produced, and that a sintered calcium phosphate article is produced to which the glass is added as a sintering aid.

In response, Applicants note that although a glass is not sintered in the industrial production of the glass, the glass in amorphous state has a transition temperature and the glass is defined as an amorphous solid showing the glass transition.

Specifically, in the present invention, the pulverized particles of the bioactive glass are added to the calcium phosphate particles in the percentage of the bioactive glass to the calcium phosphate particles of preferably 0.5 to 10% by mass, more preferably 1 to 5% by mass (see page 11, lines 15-20 of Applicants' specification). The bioactive glass of the present invention comprises CaO and SiO<sub>2</sub> as main components, which can be present in approximately equal molar ratios. Thus, the composition of the bioactive glass is substantially the same as that of the  $\beta$ -wollastonite, whereby the bioactive glass easily generates  $\beta$ -wollastonite crystals at a crystallization temperature (see page 5, lines 24-28 of Applicants' specification).

A calcium phosphate contained in the sintered calcium phosphate glass of the present invention is preferably a hydroxyapatite, a carbonated apatite or tricalcium phosphate (see page 10, lines 10-12 of Applicants' specification).

The calcium phosphate particles and the bioactive glass particles may be wet-blended with alumina balls and a solvent such as isopropyl alcohol, ethanol, etc., and dried to obtain a mixture for sintering. A green body thus obtained from the calcium

phosphate particles and the bioactive glass particles is sintered at a temperature of 700 to 1300°C for 0.5 to 10 hours of which sintering process is schematically shown in Fig. 3(a) to 3(d). As shown in Fig. 3(d), when the sintering process proceeds and the green body is heated at a temperature at which at least part of the glass components forms crystals, crystals are generated in the grain boundary phase to form crystal phases (see page 11, line 21 to page 12, line 15 of Applicants' specification).

Because the sintering temperature is lower than the melting temperature and the decomposition temperature of the calcium phosphate throughout the sintering process, the calcium phosphate particles are hardly decomposed or dissolved in the glass. Thus, the crystals such as the  $\beta$ -wollastonite crystals of certain glass components are generated between the calcium phosphate crystals, to provide the sintered, dense calcium phosphate glass. The heating rate is preferably uniform, and preferred heating rate is approximately 10°C/min. The sintering temperature is preferably maintained between the glass transition temperature and the crystallization temperature for 1 to 5 hours (see page 12, line 15-24 of Applicants' specification).

Therefore, "A sintered calcium phosphate glass" as recited in claims 10, 11, 20, and 21 is not a sintered calcium phosphate but a sintered calcium phosphate glass obtained by blending the calcium phosphate particles and the bioactive glass particles.

Accordingly, this ground of rejection should be withdrawn.

**Response To Anticipation, Obviousness and Double Patenting Rejections****(a) Rejection of claims 1,4-6, 8, 10, 11 and 12-23 under 35 U.S.C. 102(b) as being anticipated by Pfeil et al. (hereinafter "Pfeil"), U.S. Patent No. 4,135,935**

Initially, it is pointed out that Applicants' independent claim 1 is directed to a bioactive glass having a composition substantially comprising 30 to 60 mol % of CaO, 40 to 70 mol % of SiO<sub>2</sub>, and 20 mol % or less of Na<sub>2</sub>O, said bioactive glass having a glass transition temperature of 790°C or lower, wherein said bioactive glass is substantially free from P<sub>2</sub>O<sub>5</sub> and is a sintering aid in a sintered calcium phosphate glass.

In contrast, Pfeil discloses, in his Example, a ground glass of the following composition, in weight percent: 46.2 % of SiO<sub>2</sub>, 25.5% of Ca<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>, 20.2% of CaO, 2.9% of MgO, 4.8% of Na<sub>2</sub>O, and 0.4% of K<sub>2</sub>O (see column 7, lines 55-65), which corresponds to a composition, in mol %: 56.3 % of SiO<sub>2</sub>, 6.0% of Ca<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>, 26.4% of CaO, 5.39% of MgO, 5.7% of Na<sub>2</sub>O, and 0.4% of K<sub>2</sub>O.

Moreover, as is clear from claim 1 of Pfeil, Pfeil discloses a glass of the following composition as a second sintering material B, in weight %: about 20% to about 60% of SiO<sub>2</sub>, about 5% to about 40% of P<sub>2</sub>O<sub>5</sub>, about 2.7% to about 20% of Na<sub>2</sub>O, about 0.4% to about 20% of K<sub>2</sub>O, about 2.9% to about 30% of MgO, and about 5% to about 40% of CaO.

Thus, Pfeil does not teach each and every feature recited in Applicants' independent claim 1 in that Pfeil does not appear to disclose at least a bioactive glass as recited in Applicants' claim 1, wherein:

- (1) the bioactive glass has a glass transition temperature of 790°C or lower,

- (2) the bioactive glass is substantially free from  $P_2O_5$ , and
- (3) the bioactive glass is a sintering aid in a sintered calcium phosphate glass.

Accordingly, Pfeil does not teach or suggest each and every feature recited in Applicants' claim 1, and claims dependent therefrom.

Independent claim 12 is directed to a bioactive glass having a composition consisting essentially of 30 to 60 mol % of  $CaO$ , 40 to 70 mol % of  $SiO_2$ , and 0.1-5 mol % of  $Na_2O$ , wherein said bioactive glass is a sintering aid in a sintered calcium phosphate glass. In contrast, Pfeil does not teach that the bioactive glass is a sintering aid in a sintered calcium phosphate glass. Accordingly, Pfeil does not teach each and every feature of independent claim 12 and the claims dependent therefrom.

Independent claim 13 is directed to a bioactive glass having a composition consisting essentially of 30 to 60 mol % of  $CaO$ , 40 to 70 mol % of  $SiO_2$ , 0.1-5 mol % of  $Na_2O$ , and 0.1-1 mol % of  $CaF_2$ . In contrast, Pfeil does not teach a bioactive glass including  $CaF_2$ . Accordingly, Pfeil does not teach each and every feature of independent claim 13.

Independent claim 14 is directed to a bioactive glass having a composition consisting essentially of 30 to 60 mol % of  $CaO$ , 40 to 70 mol % of  $SiO_2$ , 0.1-5 mol % of  $Na_2O$ , and  $B_2O_3$ . In contrast, Pfeil does not teach a bioactive glass including  $B_2O_3$ . Accordingly, Pfeil does not teach each and every feature of independent claim 14.

Independent claim 17 is directed to a bioactive glass having a composition consisting essentially of 30 to 60 mol % of  $CaO$ , 40 to 70 mol % of  $SiO_2$ , and at least one of  $Na_2O$ ,  $CaF_2$  and  $B_2O_3$ ,  $Na_2O$  being 0.1 to 5 mol %,  $CaF_2$  being 0.1-1 mol %, and  $B_2O_3$

being 5 mol % or less. In contrast, Pfeil does not teach a bioactive glass including at least one or  $\text{CaF}_2$  and  $\text{B}_2\text{O}_3$ . Accordingly, Pfeil does not teach each and every feature of independent claim 17 and claim 19 dependent therefrom.

Further, the Examiner is reminded that Pfeil describes a composite material produced by sintering together a first sintering material A, such as hydroxyapatite, and a second starting material B composed of an inorganic multi-component system, such as a glass ceramic material which may contain at least one modifier, i.e., at least one radioactive compound, for instance,  $\text{ThO}_2$ , or at least one compound which is capable of foam formation in the sintered material, for instance, a carbonate (see abstract, lines 1-6; column 1, line 68 to column 2, line 3; and column 4, lines 51-57 of Pfeil). Pfeil does not specifically teach or suggest any composite material exhibiting high biocompatibility. For example, Pfeil does not provide any examination of the bioactive glass with respect to cell attachment, cell proliferation and alkaline phosphatase activity as described in Example 9 of the present application. Nor does Pfeil provide excellent mechanical strength and sinterability as in the present invention.

Additionally, as noted above, Pfeil is silent with respect to a glass transition temperature of 790°C or lower. Moreover, Pfeil is silent regarding the generation of  $\beta$ -wollastonite crystals at a crystallization temperature.

Accordingly, for at least these reasons, the anticipation rejection of independent claims 1, 12, 13, 14 and 17, as well as dependent claims 5, 8, 10, 11, 15, 16, 18, 19, 20, 21 and 22, and newly-added claims 24 and 25, should be withdrawn.

**(b) Rejection of claims 1-3, 5-11, 16, 19, 22 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Fujiu et al. (hereinafter “Fujiu”), U.S. Patent No. 4,708,652**

Initially, with regard to this ground of rejection, it is noted that independent claims 12 and 17 are not included in the rejection. Therefore, dependent claim 16 which is dependent upon independent claim 12 and dependent claim 19 which is dependent upon independent claim 17 are not properly included in the rejection as these dependent claims include all of the limitations of their parent claims.

Fujiu discloses an apatite composite ceramic obtained by reaction-sintering at a sintering temperature of 700-1100°C at a pressure of at least atmospheric pressure a powder mixture of a synthetic hydroxyapatite (A) and a biological active glass (B) containing fluoride ions and having a crystallization temperature below the sintering temperature in a weight ratio of A/B ranging from 60/40 to 30/70. The reaction sintered material of Fujiu is disclosed to have excellent biological affinity and high mechanical strength. Fujiu also discloses that the biological active glass (B) is selected from the scope of the following composition (disclosed in U.S. Patent No. 4,437,192): 35-60 mol % of SiO<sub>2</sub>, 0-15 mole % of B<sub>2</sub>O<sub>3</sub>, 10-30 mol % of Na<sub>2</sub>O, 5-40 mol % of CaO, 0-1 mol % of TiO<sub>2</sub>, 0-15 mol % of P<sub>2</sub>O<sub>5</sub>, 0-20 mol% of K<sub>2</sub>O, 0-10 mol% of Li<sub>2</sub>O, 0-5 mol % of MgO, 0-8 mol % of (Al<sub>2</sub>O<sub>3</sub> + ZrO<sub>2</sub> ± Nb<sub>2</sub>O<sub>5</sub>), 0-8 mol % of (La<sub>2</sub>O<sub>3</sub> + Ta<sub>2</sub>O<sub>5</sub> + Y<sub>2</sub>O<sub>3</sub>) and 5-20 mol % of F<sub>2</sub> (see Abstract, claims 1 and 4, and column 3, lines 35 et seq. of Fujiu).

In contrast to the disclosure of Fujiu, Applicants' independent claim 1 is directed to a bioactive glass having a composition substantially comprising 30 to 60 mol % of CaO, 40 to 70 mol % of SiO<sub>2</sub>, and 20 mol % or less of Na<sub>2</sub>O, said bioactive glass having a glass transition temperature of 790°C or lower, wherein said bioactive glass is substantially free from P<sub>2</sub>O<sub>5</sub> and is a sintering aid in a sintered calcium phosphate glass.

Fujiu does not teach each and every feature recited in Applicants' independent claim 1 in that Pfeil does not appear to disclose at least a bioactive glass as recited in Applicants' claim 1, wherein:

- (1) the bioactive glass has a glass transition temperature of 790°C or lower,
- (2) the bioactive glass is substantially free from P<sub>2</sub>O<sub>5</sub>, and
- (3) the bioactive glass is a sintering aid in a sintered calcium phosphate glass.

Fujiu is silent with respect to a bioactive glass having a glass transition temperature of 790°C or lower, and the bioactive glass being a sintering aid in a sintered calcium phosphate glass. Moreover, Fujiu does not discuss a bioactive glass having cell attachment, cell proliferation and alkaline phosphatase activity as described in Example 9 of the present application.

Still further, Fujiu discloses broad ranges of components, but does not sufficiently envisage to anticipate or render obvious the compositions recited in Applicants' claims. There is absolutely no motivation in Fujiu to pick and choose from the various ranges disclosed therein to arrive at Applicants' claimed subject matter. This is especially apparent from a review of the specific examples of Fujiu, such as disclosed in U.S. Patent No. 4,437,192 referenced at column 3, lines 35-53 of Fujiu.

Still further, Applicants note that the bioactive glass of Applicants' independent claim 1, and claims dependent thereon, include such features that when the bioactive glass is used as a sintering aid, the bioactive glass makes it possible to deposit  $\beta$ -wollastonite crystals having a needle-like structure at a crystallization temperature so as to provide a sintered calcium phosphate glass excellent in biocompatibility and mechanical strength (see page 5, lines 24-28; and page 20, lines 14-17 of Applications' specification), particularly suitable for the cell attachment, cell proliferation and alkaline phosphatase activity in the cell culture as described in Example 9 of Applicants' application (see page 19, line 16 to page 20, line 14; and Tables 5 and 6 at page 20 of the Applicants' specification).

In contrast, Fujiu discloses a biological active glass having the following composition: 35-60 mol % of  $\text{SiO}_2$ , 0-15 mole % of  $\text{B}_2\text{O}_3$ , 10-30 mol % of  $\text{Na}_2\text{O}$ , 5-40 mol % of  $\text{CaO}$ , 0-1 mol % of  $\text{TiO}_2$ , 0-15 mol % of  $\text{P}_2\text{O}_5$ , 0-20 mol% of  $\text{K}_2\text{O}$ , 0-10 mol% of  $\text{Li}_2\text{O}$ , 0-5 mol % of  $\text{MgO}$ , 0-8 mol % of  $(\text{Al}_2\text{O}_3 + \text{ZrO}_2 + \text{Nb}_2\text{O}_5)$ , 0-8 mol % of  $(\text{La}_2\text{O}_3 + \text{Ta}_2\text{O}_5 + \text{Y}_2\text{O}_3)$  and 5-20 mol % of  $\text{F}_2$  (see Abstract and claims 1 and 4 of Fujiu), whose features are at least different from at least features (1) and (2) as discussed above.

Still further, the dependent claims further patentably define the subject matter recited in Applicants' independent claims. Accordingly, these claims are patentable over Fujiu for the features recited in the independent claims as well as the further features recited in the dependent claims.

Also, independent claim 7 is directed to a bioactive glass having a composition substantially comprising 30 to 60 mol % of  $\text{CaO}$ , 40 to 70 mol % of  $\text{SiO}_2$ , and at least one

of Na<sub>2</sub>O, CaF<sub>2</sub> and B<sub>2</sub>O<sub>3</sub>, Na<sub>2</sub>O being 20 mol % or less, CaF<sub>2</sub> being 0.1-1 mol %, and B<sub>2</sub>O<sub>3</sub> being 5 mol % or less, said bioactive glass having a glass transition temperature of 790°C or lower. In contrast, a content of CaF<sub>2</sub> is not defined in Fujii and is different from Fujii who discloses 5-20 mol % of F<sub>2</sub>.

Also, Fujii does not appear to teach or suggest such a bioactive glass having a glass transition temperature of 790°C or lower.

Moreover, Fujii does not discuss a bioactive glass having cell attachment, cell proliferation and alkaline phosphatase activity in the cell culture as described in Applicants' Example 9.

Therefore, those skilled in the art referring to Fujii would not be motivated to arrive at Applicants' claimed subject matter as recited in claim 7.

Moreover, dependent claim 9 is patentable at least for its dependency upon independent claim 7.

Accordingly, this ground of rejection should be withdrawn.

**(c) Rejection of claims 1, 2, 4-9, 17, 19, 22 and 23 under 35 U.S.C. 102(b) as being anticipated by Suh et al. (hereinafter "Suh"), U.S. Patent No. 5,634,956.**

Suh discloses a glass ceramic for use as a biomaterial comprising CaO 34.6 to 54.6%, SiO<sub>2</sub> 24.2 to 44.8 %, P<sub>2</sub>O<sub>5</sub> 0 to 8.0 %, CaF<sub>2</sub> 0.1 to 1.0 % and MgO 1.0 to 10.0 % by weight, the glass ceramic having a primary crystalline phase which is wollastonite (CaO, SiO<sub>2</sub>) and a secondary apatite crystalline phase which can be an apatite without

adding the glass ceramic as such to calcium phosphate (see Abstract; column 2, lines 10-15; column 3, lines 38-40 and lines 46-49 (Examples 1 and 2) of Suh).

Applicants once again respectfully submit that Suh fails to teach or suggest any feature such that the glass ceramic as such might have a function to promote the sintering in the process of sintering calcium phosphate, even when the glass thereof is added to calcium phosphate.

Moreover, Suh is silent with respect to a bioactive glass having a glass transition temperature of 790°C or lower. Thus, while Suh discloses compositions that have CaO and SiO<sub>2</sub> in the bioactive glass that overlap with Applicants' recited ranges, Suh is silent with respect to any bioactive glass having a glass transition temperature of 790°C or lower. The rejection does not indicate any reasoning for considering the glass transition temperature recited in Applicants' claim 1, as being within any composition disclosed in Suh. While it is asserted that the properties of compositions between identical compositions cannot be mutually exclusive, the rejection does not provide reasoning as to show that the compositions including the various components disclosed in Suh would be expected to have the properties recited in Applicants' claim 1.

Still further, Suh does not disclose a bioactive glass being a sintering aid in a sintered calcium phosphate glass.

Also, independent claim 7 is directed to a bioactive glass having a composition substantially comprising 30 to 60 mol % of CaO, 40 to 70 mol % of SiO<sub>2</sub>, and at least one of Na<sub>2</sub>O, CaF<sub>2</sub> and B<sub>2</sub>O<sub>3</sub>, Na<sub>2</sub>O being 20 mol % or less, CaF<sub>2</sub> being 0.1-1 mol %, and B<sub>2</sub>O<sub>3</sub> being 5 mol % or less, said bioactive glass having a glass transition temperature of

790°C or lower. In contrast, Suh does not appear to disclose a bioactive glass having a glass transition temperature of 790°C or lower.

Accordingly, independent claim 7 is not properly rejected as being anticipated by Suh.

Claim 9 is not properly rejected as least based upon its dependency upon claim 7.

Independent claim 17 is directed to a bioactive glass having a composition consisting essentially of 30 to 60 mol % of CaO, 40 to 70 mol % of SiO<sub>2</sub>, and at least one of Na<sub>2</sub>O, CaF<sub>2</sub> and B<sub>2</sub>O<sub>3</sub>, Na<sub>2</sub>O being 0.1 to 5 mol %, CaF<sub>2</sub> being 0.1-1 mol %, and B<sub>2</sub>O<sub>3</sub> being 5 mol % or less. In contrast, Suh does not disclose at least 0.1-5 mol % Na<sub>2</sub>O in a bioactive glass.

Accordingly, the anticipation rejection of claim 17 and claim 19 dependent therefrom should be withdrawn.

Therefore, the anticipation rejection should be withdrawn.

**(d) Rejection of claims 13 [1-3], 5-9, 12-19, 22 and 23 under 35 U.S.C. § 102(b) as being anticipated by Japanese document 61-205637 (JP'637)**

JP'637 discloses a composition of a crystal glass comprising at least 90 wt% or more comprising 40-60 wt% SiO<sub>2</sub>, 30-45 wt% CaO, 1-17 wt% MgO, and 10 wt% or less of impurities and a minute wollastonite (CaO.SiO<sub>2</sub>) crystals dispersed in the crystal glass as at least one of the deposited crystals (see English abstract of JP '637 and Table I in JP'637).

The Examiner is reminded that, in contrast to JP'637, the subject matter recited in Applicants' claim 1 includes:

- (1) the bioactive glass has a glass transition temperature of 790°C or lower,
- (2) the bioactive glass is substantially free from P<sub>2</sub>O<sub>5</sub>, and
- (3) the bioactive glass is a sintering aid in a sintered calcium phosphate glass.

However, JP'637 is silent with respect to a bioactive glass having a glass transition temperature of 790°C or lower. Also, the composition of JP '637 is not disclosed as being suitable for an examination of the bioactive glass with respect to cell attachment, cell proliferation and alkaline phosphatase activity as described in Example 9 of the present application.

Also, JP'637 fails to teach or suggest any feature such that the glass ceramic as such might have a function to promote the sintering in the process sintering calcium phosphate, even when the glass thereof is added to calcium phosphate.

Therefore, those skilled in the art referring to JP'637, which discloses a bioactive glass different from the present invention, and does not appear to teach any bioactive glass having a glass transition temperature of 790°C or lower as well as having a function to promote the sintering in the process sintering calcium phosphate in the presence thereof, would not be motivated to arrive at Applicants' bioactive glass.

Accordingly, independent claim 1 and the claims dependent therefrom are not properly rejected for anticipation based upon JP '637.

Also, independent claim 7 is directed to a bioactive glass having a composition substantially comprising 30 to 60 mol % of CaO, 40 to 70 mol % of SiO<sub>2</sub>, and at least one

of  $\text{Na}_2\text{O}$ ,  $\text{CaF}_2$  and  $\text{B}_2\text{O}_3$ ,  $\text{Na}_2\text{O}$  being 20 mol % or less,  $\text{CaF}_2$  being 0.1-1 mol %, and  $\text{B}_2\text{O}_3$  being 5 mol % or less, said bioactive glass having a glass transition temperature of 790°C or lower. In contrast, JP '637 does not disclose  $\text{CaF}_2$  being 0.1-1 mol %. Further, JP '637 does not appear to disclose a bioactive glass having a glass transition temperature of 790°C or lower.

Accordingly, independent claim 7 is not properly rejected as being anticipated by JP '637.

Claim 9 is not properly rejected at least based upon its dependency upon claim 7.

Independent claim 12 is directed to a bioactive glass having a composition consisting essentially of 30 to 60 mol % of  $\text{CaO}$ , 40 to 70 mol % of  $\text{SiO}_2$ , and 0.1-5 mol % of  $\text{Na}_2\text{O}$ , wherein said bioactive glass is a sintering aid in a sintered calcium phosphate glass. Accordingly, claim 12 is not anticipated at least because JP '637 does not disclose a bioactive glass used for a sintering aid in a sintered calcium phosphate glass, but also in not disclosing 0.1-5 mol % of  $\text{Na}_2\text{O}$ .

With respect to claims 15 and 18, and new claim 25, their patentability is clear at least by virtue of the basis of their dependency from claim 12.

Independent claim 13 is directed to a bioactive glass having a composition consisting essentially of 30 to 60 mol % of  $\text{CaO}$ , 40 to 70 mol % of  $\text{SiO}_2$ , and 0.1-5 mol % of  $\text{Na}_2\text{O}$ , and 0.1-1 mol %  $\text{CaF}_2$ . In contrast, JP '637 does not disclose using both  $\text{Na}_2\text{O}$  and  $\text{CaF}_2$ .

Independent claim 14 is directed to a bioactive glass having a composition consisting essentially of 30 to 60 mol % of  $\text{CaO}$ , 40 to 70 mol % of  $\text{SiO}_2$ , 0.1-5

mol % of Na<sub>2</sub>O, and B<sub>2</sub>O<sub>3</sub>. In contrast, JP '637 does not disclose at least 0.1-5 mol % of Na<sub>2</sub>O, with or without B<sub>2</sub>O<sub>3</sub>.

Independent claim 17 is directed to a bioactive glass having a composition consisting essentially of 30 to 60 mol % of CaO, 40 to 70 mol % of SiO<sub>2</sub>, and at least one of Na<sub>2</sub>O, CaF<sub>2</sub> and B<sub>2</sub>O<sub>3</sub>, Na<sub>2</sub>O being 0.1 to 5 mol %, CaF<sub>2</sub> being 0.1-1 mol %, and B<sub>2</sub>O<sub>3</sub> being 5 mol % or less. In contrast, JP '637 does not disclose both 0.1-5 mol % of Na<sub>2</sub>O and 0.1-1 mol % of CaF<sub>2</sub>, in the crystal glass thereof.

Claim 19 is also not anticipated by at least its dependency upon claim 17.

Accordingly, the anticipation rejection should be withdrawn.

**(d) Claims 12-19 under 35 U.S.C. 102(b) as being anticipated by Kume et al. (hereinafter "Kume"), U.S. Patent No. 4,443,550**

In response to this ground of rejection, Applicants submit that in contrast to Applicants' claimed subject matter, Kume discloses a glass composition for production of a fibrous wollastonite used as a reinforcing material for Portland cement, etc., which has the composition comprising 35-60 wt% SiO<sub>2</sub>, 30-55 wt% CaO, 0-8 wt% (Na<sub>2</sub>O + K<sub>2</sub>O), 1-30 wt% B<sub>2</sub>O<sub>3</sub>, 0.2-4 wt% Li<sub>2</sub>O and 0-8 wt% Al<sub>2</sub>O<sub>3</sub>, wherein at least one of Li<sub>2</sub>O, Al<sub>2</sub>O<sub>3</sub>, and Na<sub>2</sub>O is present (see claim 1 with Certificate of Correction attached to Kume). Kume also discloses a number of compositions having Na<sub>2</sub>O in varying weight percents, and Na<sub>2</sub>O is disclosed at column 4, line 8 as being present from 0 to 4 wt%. However, Kume does not disclose 0.1-5 mol % of Na<sub>2</sub>O and any bioactive glass to be used for a sintering aid in a

sintered calcium phosphate glass as recited in Applicants' claims. In this regard, Applicants recited bioactive glass having a composition consisting essentially of 30 to 60 mol % of CaO, 40 to 70 mol % of SiO<sub>2</sub>, and 0.1-5 mol % of Na<sub>2</sub>O, wherein said bioactive glass is a sintering aid in a sintered calcium phosphate glass is not sufficiently envisaged in Kume.

Accordingly, claim 12 is not anticipated by Kume.

With respect to claims 15 and 18, and new claim 25, their patentability is clear at least by virtue of the basis of their dependency from claim 12.

Also, the features of claim 13 are different from those of Kume in including 0.1-5 mol % of Na<sub>2</sub>O, and 0.1-1 mol% CaF<sub>2</sub>.

Further, the features of claim 14 are different from those of Kume in including 0.1-5 mol % of Na<sub>2</sub>O.

Still further, the features of claim 17 are different from those of Kume in including both Na<sub>2</sub>O and CaF<sub>2</sub> as components of the bioactive glass.

Accordingly, it is clear that claims 13, 14 and 17 are not anticipated by Kume.

Claim 19 is not properly rejected at least for its dependency on claim 17.

Accordingly, the anticipation rejection is without appropriate basis and should be withdrawn.

**(e) Rejection of claims 1-3 and 5-23 under the judicially created doctrine of obviousness-type double patenting over claims 1-11 of copending Application No. 10/962,557**

In response to this ground of rejection, Applicants note that Application No. 10/962,557 is pending, and an Office Action has been mailed on October 24, 2005 including rejections of the claims pending therein. Therefore, Applicants respectfully submit that, in conformance with Patent and Trademark Office procedure and in view of the fact that Application No. 10/962,557 is not a patent, the present application can be sent to issue.

Still further, Applicants respectfully request the Examiner to reconsider the double patenting rejection based upon the merits in view of the presently pending claims.

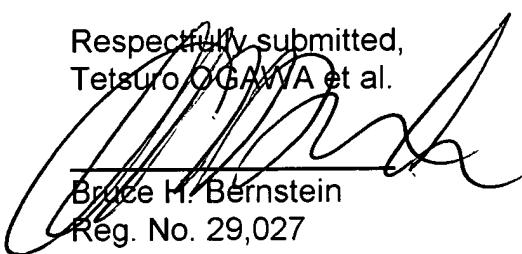
**CONCLUSION**

In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections of record, and allow each of the pending claims.

Applicants therefore respectfully request that an early indication of allowance of the application be indicated by the mailing of the Notices of Allowance and Allowability.

Should the Examiner have any questions regarding this application, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Respectfully submitted,  
Tetsuro OGAWA et al.

  
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March 13, 2006  
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UNITED STATES PATENT AND TRADEMARK OFFICE  
CERTIFICATE OF CORRECTION

PATENT NO. : 4,443,550

DATED : April 17, 1984

INVENTOR(S) : Makoto Kume et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Claim 1, line 7, "0 to 4" should read --0.2 to 4--

Signed and Sealed this  
Sixteenth Day of October 1984

[SEAL]

Attest:

Attesting Officer

GERALD J. MOSSINGHOFF

Commissioner of Patents and Trademarks

COPY